RESEARCH TOPIC MECM_12
Smooth muscle cell phenotypes at the single-cell level: specific role during atherosclerosis development in humans

Curriculum
MECM Standard

Research Area
Cardio

Laboratory name
Vascular Epigenetics Lab

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Abstract
Atherosclerosis (AT) is a systemic cardiometabolic disease affecting the vasculature of multiple organs. AT is a complex, multifactorial disease involving diverse cell types, including vascular smooth muscle cells (VSMCs). Advances in single-cell RNA sequencing (scRNA-seq) have enabled the detection of RNA information at a single-cell resolution, demonstrating the cellular heterogeneity and intercellular communication within tissues involved in atherosclerosis and the role in plaque development.
The principal activities are: 1) to determine the role of specific VSMC sub-populations, identified through scRNA-seq and other molecular techniques in human AT; 2) to define the intercellular communication among various vascular cellular populations and its role in disease development, by means of spatial mRNA profiling of human AT plaques; and 3) to define the causal role of these VSMC sub-populations in AT, as assessed in a genetic AT-resistant mouse model.

Main technical approaches
Single-cell RNA sequencing, flow cytometry, cellular Biology, ,molecular biology, animal models

Scientific references
1. Farina FM (2022). DOI: 10.1093/eurheartj/ehac097

2. Wirka (2019). DOI: 10.1038/s41591-019-0512-5

3. Pan (2020). DOI: 10.1161/CIRCULATIONAHA.120.04837

Type of contract

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